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Reply To: 3420

Date: May 22, 1995

Subject: Evaluation of potential for buildup of pine engraver beetles in downed trees resulting from snow breakage on the Foresthill Ranger District, Tahoe National Forest (NE95-9).

To: District Ranger, Foresthill Ranger District

On May 16, 1995, Sheri Smith, Entomologist, Jane Laboa, Forest Silviculturist, and Gail Parn, District Silviculturist, Tony Rodarte, Vegetation Management Officer, Steve Arney, District Fuels Specialist and Chris Rowe, Forestry Technician, Foresthill Ranger District, visited the Volcano plantation area to examine the extensive snow breakage and to discuss the potential for pine engraver, Ips paraconfusus, buildup in the downed material and options to limit subsequent topkill and mortality of standing trees.

Introduction

The two Sale areas (Sellier and Mountain Chief) we visited are part of the Volcano plantation that was established after a stand replacing fire. The plantation is comprised primarily of 30-35 year old ponderosa pine and covers about 10,000 acres. During late March and early April, 1995, heavy, wet snow storms hit the Foresthill area causing extensive breakage of branches and whole trees. Most of the observed damage was tree tops snapped off at about 10-15 feet above ground and appears to have occurred in the elevational band between 3,500 - 4,200 ft, covering about 2,000 acres.

Field Observations

Sellier Sale Area - Thinning in this area began in 1994 with additional work scheduled for this year. The thinned stands have a residual spacing of 22 feet between trees and a 30x30 ft. spacing along the road to serve as a fuel break. It is west of the Mountain Chief sale area, the two being divided by the 10-6 road. Very little breakage was observed in the thinned stands (about 1 snapped top for every 5-10 acres).

Mountain Chief Sale Area - This area is under a thinning contract, however it is currently on hold and the project probably won't operate this year due to a plant buyout by PG&E. These stands were fairly dense with most tree crowns

contacting one another. There is extensive damage throughout the areas we inspected. Broken tops were scattered throughout the stands in addition to several areas of heavy concentrations of breakage (estimated 5-10 trees in 1/4 acre to 1 acre areas). Some concentrations involve trees within areas up to 2 acres in size.

DISCUSSION

The District is concerned about the extensive snow breakage concentrations from a forest health and fuels loading perspective. When I visited the areas last week there was no evidence of pine engraver attacks (ie. frass piles) in any of the downed material. Pine engravers can breed in fresh pine slash, sapling to pole size standing trees, and in the tops of standing trees. There are usually 2 or more generations during the summer and an overwintering generation. Pine engraver beetles can build up in the slash and attack surrounding trees resulting in topkill and/or mortality. During the warmer months, pine engravers can complete their lifecycle in about 1-1/2 to 2 months. Pine engraver damage associated with the snow breakage is unpredictable. There are years when very few trees are killed, despite suitable slash which is heavily infested with pine engravers. What appear to be similar conditions in other years have led to unacceptable tree mortality and/or topkill. To the extent that the host material can be treated, some potential, localized residual tree damage will be prevented.

In the Mountain Chief sale area the potential for pine engraver buildup is extreme due to the relatively closed canopy and extreme moist conditions. The down material is not likely to dry out soon, thus will be suitable host material for several months. I would not expect a high percentage of the material to become infested by the overwintering generation of pine engravers, however, the population can build rapidly if suitable host material is continuously available.

Management Alternatives

1. **Do nothing.** This assumes that there would be no salvage or other work done in the plantation. If the downed material becomes infested with pine engravers, some topkill and mortality can be expected in the residual trees. This may be somewhat less than in previous drought years assuming the trees are immediately able to use the additional moisture, however, tree vigor is still reduced due to the overstocking.

Fuel loading is highest in the areas of concentrated mortality. Of particular concern are areas along roadsides that are managed as fuel breaks. In addition to the down material, subsequent mortality would lead to an increase in fuel loading. The majority of additional mortality would be expected to occur in close proximity to the areas of concentrated breakage.

2. **Treatment of down material.** There are several options available to treat the material to reduce subsequent damage. If all areas cannot be treated, areas with the highest number of concentrations of down material should be

treated first. Some methods of slash treatment may be more acceptable than others from a fuels reduction standpoint.

A. Slash disposal: Slash can be removed from the site for processing or disposal or if left on-site, it can be piled and burned, chipped, debarked, buried, or lopped and scattered. Any treatment that speeds the drying process will reduce pine engraver habitat suitability. Guidelines should include treating all material greater than 3 inches in diameter. If slash becomes infested prior to treatment, there is a 6-8 week window to treat before beetle emergence would occur.

Removal: The District is currently pursuing removal by way of fuel wood gathering. People purchasing firewood permits can be directed to areas of extensive breakage. In addition, the suggestion could be made to the operators of the Sellier Sale to prioritize thinning operations for this season in areas of concentrated snow breakage.

Burying: Burying of slash will prevent it from being colonized by engraver beetles, but will not prevent emergence of beetles. Therefore, it should be buried before becoming infested.

Lop and scatter: Lop all branches from those portions of main stems which are 3" or more in diameter. Lopped stems can also be cut into short segments (3-5 feet in length) and spread out to decrease drying time.

B. Pheromone treatment: One option discussed in the field is the use of anti-aggregation pheromones to decrease pine engraver attacks. These pheromones are produced synthetically and incorporated into a bubble cap with a semi-permeable membrane. The bubble caps are attached to slash to prevent pine engraver attacks. To date, research involving the use of anti-aggregation pheromones has shown promise in limiting pine engraver attacks in small, piled slash tests. Tests are planned for this summer to determine the efficacy of the bubble caps in scattered slash.

Because of the expense of the bubble caps and the lack of information available for area wide use, I would suggest holding off on this strategy to see what the level of infestation is going to be and target the first generation emergence if necessary in areas not treated by other methods. If the District wants to pursue this option, I can provide more information.

3. Monitoring. A wait and see approach can be taken to to determine if the down material becomes infested and then make a decision to apply one of more of the above treatment methods. If the material becomes infested, treatment would need to occur within 6-8 weeks to prevent future attacks in the slash or to standing trees. I placed 4 beetle traps in the areas of snow breakage on May 16 to monitor beetle flight. These will be checked weekly to provide information on when beetle flight begins, and therefore, when the material may be attacked.

Monitoring of any subsequent top kill or mortality will be conducted in all areas to, 1) provide some information on the efficacy of the treatments and 2) provide damage information for areas not treated.

Funding Opportunities

The Foresthill Ranger District received $26,000 of Forest Pest Management Prevention/Suppression Funds for FY95 to prune rust infected sugar pine. These funds can be allocated for use in a slash treatment project based on the District's priorities. Additional prevention/suppression funds can be pursued next year for sugar pine pruning.

I will be monitoring the beetle flight traps and the snow breakage material and will coordiante my efforts with Chris and Gail as discussed. If you have any further questions, please contact me at 916-257-2151.

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